August, 1953

THE CHEMIST

VOLUME XXX NUMBER 8

DR. AUGUST MERZ

Receives Scroll of AIC New Jersey Chapter

(See Page 375)

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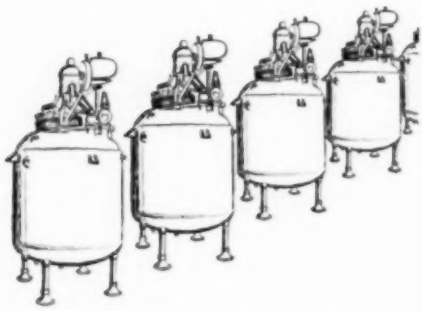

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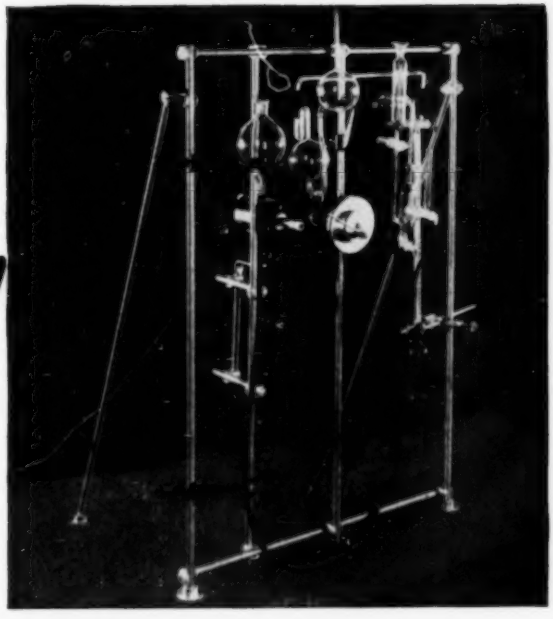

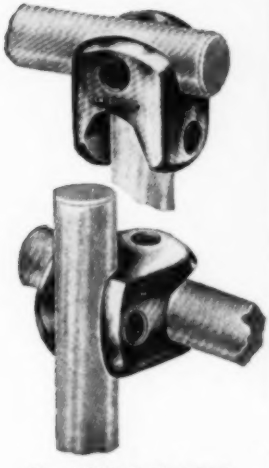

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Annual Reports

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Herman Mark — What Are His Marks? Dr. Emil Ott, F.A.I.C.

Careers in Chemistry, Richard L. Moore, F.A.I.C.

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The Prevention of Deterioration Center, Glenn A. Greathouse, F.A.I.C., Carl J. Wessel, F.A.I.C., and Bryson Fleer

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The September CHEMIST will bring the award of the New York Chapter Honor Scroll to Dr. Herman Mark, F.A.I.C. Dr. Emil Ott, F.A.I.C., will reveal Dr. Mark's character and adventures. In "The Chemist and His Industry", Dr. George F. Rugar, F.A.I.C., will show how the chemist can create and maintain favorable Public Relations for the chemical industry. Also other papers presented at the Annual Meeting and additional material of special interest will appear.

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Nominations for the AIC Gold Medal

THE Gold Medal of THE AMERICAN INSTITUTE OF CHEMISTS is awarded annually "for noteworthy and outstanding service to the science of chemistry or the profession of chemist in America."

The selection of the medalist is made by the Jury of Medal Award. The members of the Jury are "the active president of the AIC, the three immediately preceding eligible past presidents of the AIC, and the secretary of the AIC. Each member shall have but one vote. The senior past president member of the Jury shall be the chairman thereof."

The name of the recipient of the Gold Medal is customarily announced in the late Fall, and the medal is presented at the Annual Meeting held the following May.

Previous recipients of the Gold Medal are: 1926—William Blum; 1927—Lafayette B. Mendel; 1928—no award; 1929—Mr. and Mrs. Francis Patrick Garvan; 1930—George Eastman; 1931—Andrew W. and Richard B. Mellon; 1932—Charles H. Herty; 1933—Henry C. Sherman; 1934—James Bryant Conant; 1935—no award; 1936—Marston Taylor Bogert; 1937—James F. Norris; 1938—Frederick G. Cottrell; 1939—no award; 1940—Gustav Egloff; 1941—Henry G. Knight; 1942—William Lloyd Evans; 1943—Walter S. Landis; 1944—Willard H. Dow; 1945—John W. Thomas; 1946—Robert P. Russell; 1947—Moses Leverock Crossley; 1948—Charles A. Thomas; 1949—Warren K. Lewis; 1950—Walter J. Murphy; 1951—Harry N. Holmes; 1952—Fred J. Emmerich, and 1953—J. C. Warner.

In order to make the best possible selection of a medalist for the 1954 Gold Medal, Dr. Gustav Egloff, chairman of the current Jury of Medal Award, asks members of the AIC to send the names of worthy nominees for this award to him at Universal Oil Products Co., 30 Algonquin Road, Des Plaines, Ill., or to the Secretary of THE AMERICAN INSTITUTE OF CHEMISTS. Each name should be accompanied by documentation so that the Jury may have sufficient information before it to make a fair decision.

A meeting of the Jury of Medal Award will be held sometime in the early Fall, and therefore, those who know of worthy candidates should send the names and information promptly.

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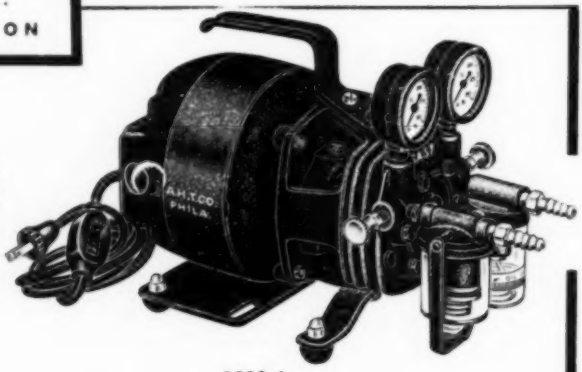

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Appreciate the Prologue

Dr. August Merz, F.A.I.C.

Calco Chemical Division, American Cyanamid Company, Bound Brook, N. J.

(A message from the author when he received the Honor Scroll of the New Jersey AIC Chapter.)

ON THE facade of the National Archives Building in Washington is inscribed, "What is past is prologue." An acquaintance going there had this called to his attention by his taxi driver, who said, "You know what that means? It means you ain't seen nothing yet!"

Even the most erudite have no difficulty in understanding the vernacular. Maybe the taxi driver had heard Dr. Vannevar Bush's recent plea for the use of more intelligible language in science. Either version will serve as my text for a few remarks.

How little we appreciate the wonderful prologue which furnishes the foundation for all work in our science. Are we not too casual about the debt we owe to the pioneers who contributed to the prologue?

Think of the plight in which we would find ourselves if the fundamentals which have been disclosed in the past were lost and required reaffirmation. How true are the words spoken by Seneca nineteen-hundred years ago, "The time will come when careful study through long ages will bring to light the secrets of nature."

Recently the Metropolitan Section of the American Society of Civil Engineers was polled to pick the seven engineering wonders of New York. Why should not the chemists pick the seven wonders of chemistry for all time?

Twenty per cent of the engineers picked the George Washington Bridge as the No. 1 engineering wonder. Would twenty per cent of the chemists agree on one top wonder of chemistry, and what might it be?

The prologue of today facilitates the discoveries of tomorrow which at once become prologue to the still greater discoveries of the future. I need not remind you of the growth of our science during the last decades. Many of you have lived through them. I venture to say that few of you can go back to 1900 in actual experience. But you can safely believe the old-timers who say that the progress has been like that of an avalanche.

And that is why the taxi driver's crude expression, "You ain't seen nothing yet", is quite as true and apt as Seneca's more elegant one of nineteen-hundred years ago, "The time will come when careful study through long ages will bring to light the secrets of nature."

Dr. August Merz

Dr. M. L. Crossley, Hon. AIC

Past President, The American Institute of Chemists

(Introduction of Dr. Merz when he received the Honor Scroll of the New Jersey AIC Chapter.)

A CHEMIST, forever nameless, sojourning in the United States in a comfortable chair in one of our great universities remarked to me scornfully and with unconscious rudeness, that there were few cultured gentlemen among American chemists. He could not have known August Merz.

This man is truly a great American gentleman, schooled in the art of self-restraint and courteous behavior; the essential overtones of true culture. Gracious in manner, sympathetic in understanding, mild in exposition, tolerant in human relations, vigorous in pursuing truth, steadfast in maintaining high ideals, he has been a constant inspiration to all who have had the privelege of being associated with him.

I once overheard a young associate complaining to him that others were getting credit for what he had done and, with a kindly twinkle in his eye, Mr. Merz pointed out that many wish to get their thumb prints on success but few are willing to accept responsibility for failures. He went on to assure the young chemist that credit is not always given to those who claim it and that the true worth of a man is always recognized by those capable of understanding and appreciating good work leading to successful results. This is typical of August Merz. Envious of none and generous in dealing with all, he has served the chemical profession for more than half a century with honor, reputation and usefulness.

In all the years that I have known August Merz I have never heard him speak ill of anyone nor have I known him to entertain gossip and slander about anyone. He never participated in unjust and ill-founded criticisms. His mind worked on a high plane. His interests in life are broad and deep, his knowledge profound. His ideas are provocative and forceful. His charming manner and mild disposition give him distinction in group discussions and cooperative endeavors.

August Merz is a pioneer in the chemical industry in the United States of America. He helped to lay the foundation for the industry as we know it today. It took courage and perseverance to conduct research in dye chemistry in the United States in 1897, when Mr. Merz began his work with the Heller & Merz Company. To succeed in com-

petition with the German cartels without any tariff protection was a great undertaking. Heller and Merz did it and August Merz played an important role in the progress of the company. As director of research, superintendent of production, treasurer and plant manager he fought the battles of the infant dye industry and made possible the nucleus around which has developed the present chemical industry in this country. Those who are familiar only with the present accomplishments of the chemical industry and with the development of the chemical profession made necessary by this industry have no basis for comparison with the situation that existed prior to the First World War. The events which developed at the time that we entered into this war brought home to Americans the fact that we were as a nation entirely at the mercy of foreign manufacturers for not only the dyes that we use in textile products, but also, for the drugs and instruments needed in medical care. Mr. Merz has led the fight to impress upon both the government and the citizens of this country the importance of the chemical industry to our well-being. As a result we have in this country today an industry and a trained personnel to carry it on. We have a chemical profession in which every type of chemist and chemical engineer needed for the efficiency of the industry have been educated and trained to meet the needs. His careful scrutiny of the many attempts on the part of foreign manufacturers to evade the tariff laws has helped to prevent unfair competition from abroad. No man could be more worthy of recognition by his fellow chemists than the man we have chosen to honor. In honoring him we enhance the reputation of THE AMERICAN INSTITUTE OF CHEMISTS. We recognize in him the worth of service rendered in the light of truth, with honor and unselfish devotion to ideals. It is a privilege and honor to me to present August Merz to receive this Honor Scroll.

Consulting Chemist: Dr. Eric C. Kunz, F.A.I.C., formerly with Givaudan-Delawanna, Inc., New York, N. Y., now at "Doctor Kunz Farm", Arden, North Carolina.

Test Director: Commander Roland A. Bosee, MSC, U. S. Navy, F.A.I.C., now at Naval Parachute Unit, Department of Defense Parachute Facility, El Centro, California. He was formerly head, Physiological Test Branch, Naval Air Test Center, Patuxent River, Md.

Appointed: By R. S. Aries & Associates, 400 Madison Ave., New York, N. Y., H. Roger Coleman as development director.

Dr. Merz accepts the Honor Scroll from Dr. James B. Allison.

The Presentation

DR. AUGUST MERZ, research adviser and consultant to the American Cyanamid Company and former vice president of Calco Chemical Company, received the second Honor Scroll of the New Jersey AIC Chapter at a meeting held May 5, 1953, at the Military Park Hotel, Newark, N. J.

Dr. M. L. Crossley, former director of Research of American Cyanamid Company and former president of THE AMERICAN INSTITUTE OF CHEMISTS, spoke for the recipient. Dr. James B. Allison, chairman of the New Jersey Chapter presented the Honor Scroll to Dr. Merz, who responded with the message, "Appreciate the Prologue." In acknowledging the Honor Scroll, he stated:

"This scroll, the citation and the fine words by Dr. Crossley are a

great stimulant. They are like rich wine. They warm the heart and I fear go to the head. I have always liked Bobbie Burns' lines:

> 'O wad some power the giftie gie us
> To see oursels as ithers see us.'

"They seem like an admonition to keep your feet on the ground and your head out of the clouds. But if I see myself as you have pictured me, then humility flies out of the window!

"I realize acceptance of this honor imposes an obligation to increase many-fold anything I may have done to further the cause of our science. And I pledge to do that to the best of my ability."

The citation to Dr. Merz reads: *in recognition of untiring efforts and invaluable service to his profession, both as an individual and as a member of The American Institute of Chemists.*

Dr. Allison then presented student awards in recognition of leadership, character, and high scholastic standing to the following seniors in chemistry: Ronald Elliott Cape of Princeton University, who was introduced by Prof. Gregg Dougherty of Princeton, and Peter Joseph Wojtowicz of Rutgers University, who was presented by Dr. E. R. Allen, F.A.I.C.

AIC President Work brought greetings to Dr. Merz and welcomed the student award recipients to Associate membership in the AIC.

Prof. Stephen J. Toth of the New Jersey State Agricultural Experimental Station spoke on "Soil Conditioners," followed by an active discussion period. In summary, soil conditioners are not effective on sandy soils. Their effectiveness varies on other soils according to the type of conditioner, its concentration, the type of soil, and other factors. "The agricultural possibilities of synthetic soil conditioning chemicals are large once the cost is reduced to a level at which the farmer can utilize them."

Promoted: Cyril S. Kimball, F.A.I.C., from vice president to executive vice president of Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. He joined the company in 1926. "Cy" has been successively honorary secretary, vice-chairman and chairman of the American Section of the Society of Chemical Industry, and vice-president of the Society of Chemical Industry. He has held offices in the AIC and the American Chemical Society.

Opposed: To cutting tariffs on scientific apparatus and equipment, the Scientific Apparatus Makers Association, 20 North Wacker Drive, Chicago 6, Ill. "It's pretty hard to rely upon a foreign supplier for a piece of apparatus that is needed for a research project, today, which may determine our destiny as a country tomorrow."

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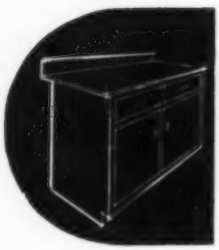

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Exposition: The 24th Exposition of Chemical Industries will be held in the Commercial Museum and Convention Hall, Philadelphia, Pa., November 30th to December 5th. Charles F. Roth, F.A.I.C., International Exposition Company, 480 Lexington Ave., New York 17, N. Y., is manager of the exposition.

Don't Be a Stillborn Chemist

Dr. Raymond E. Kirk, F.A.I.C.

Head Department of Chemistry, Dean of the Graduate School, Polytechnic Institute of Brooklyn, Brooklyn 2, New York

(Presented at the AIC-ACS Symposium on Public Relations for Chemists.)

I TRUST that I may be forgiven the presumption involved in the title which I have chosen. I am not qualified by either training or temperament to occupy the pulpit. I have no desire to give vent to threatening admonitions. I wish only to discuss with as much pertinence as I can muster my ideas about the important responsibility placed on each of us in his professional career, to keep on growing, and to continue to learn. It is very desirable for the young man just out of college to be certain of this continued development. It is very important for the young chemist with his doctorate newly draped over his shoulder. It is, however, equally important for the chemist of fifty, or sixty, or seventy. It is important for *each chemist* at *each stage* in his career to keep on acquiring factual knowledge. Fortunately, it is easy to forget facts that we do not use, but one seldom forgets where they can be found once he has been familiar with them.

It is even more important for each of us to strive to understand the meaning of things. This requires examination, reflection, and re-examination. Especially does it require an attitude where one refuses to accept without reflection "things as they are." In one of his essays, Robert Louis Stevenson said, "One should refuse to swallow the universe as one would a pill." The fine balance between simplicity and complexity that is involved in organizing our knowledge of the world can be achieved and maintained only by continuous processes of valuation and revaluation. Each of us finds it highly desirable to continue to develop his understanding of people, and of their inter-relationships of one to the other. We bring our ideas whether they be in science or in government to fruition by working with and through people. It does little good to have approval from the laboratory supervisor for a new piece of apparatus, if one is unable to communicate with the mechanic who is to build the piece of apparatus. It does little good to understand the intricacies of some abstruse problem, if one is unable to communicate this understanding to his associates. As you all know, the ideal director of research never directs research! His primary function is to

understand and encourage the people in his organization who actually do direct the research. The member of a board of directors seldom directs. His function is usually to understand and approve of the operation of the executive who actually is directing! We all understand too how very important it is for us to learn more about why human beings are human beings and why each is the kind of human being that he is. I know of no one person fully qualified to hold a university chair in this subject! Most of us acquire what little knowledge we have in this field by a method which might perhaps best be described as one of trial and error.

I realize my presumption in presenting my thoughts regarding the continuing self-development of chemists since I realize that our profession has in it so many men who are extremely articulate interpreters of science at so many levels and to so many different groups. Our profession is studded with the names of men who have had outstanding successes in communicating their ideas and in developing increasingly greater and greater abilities in communication. A great many of our colleagues have established their ability to influence the thinking and to gain the confidence and respect of their associates and of their superiors. They have been able to build loyal and devoted staffs of scientific workers. They have been able to influence top management. They have swayed the thinking of boards of directors and boards of trustees. It is indeed not surprising that many of them have "infiltrated" top management and executive offices! This is a further tribute to their continuing development both in science and in their knowledge of human relationships. An increasingly large number of our colleagues have demonstrated the highly important ability to influence the thinking of the general public. Their statements have been widely sought and have been highly influential. They have been in themselves outstanding examples for the rest of us in the continuing development of one's complete self.

The achievements of chemists in all of the fields referred to is more spectacular when one realizes the point of departure for the average chemist. It seems to me that in the past, we have been somewhat reluctant to recognize the initial handicap that many of us face when we start our professional careers. A personal anecdote may aid me to illustrate the point. I recently had a conversation with the assistant director of admissions at the institution where I have the honor of teaching. We were talking about the application of a brilliant high school student known to some of our staff. The young man has already progressed through several of the levels in the "Westinghouse Science Talent Search." We are very hopeful that he will obtain a Westinghouse fellow-

ship. We are very hopeful that he will come to our laboratories for his college training. Our capable assistant director of admissions said to me "this young man is like all the chemists, he has his head in the clouds." Your first reaction may be similar to my first reaction! However, by the time I had counted to ten, I realized that I was getting a very frank and therefore a very valuable comment from one of my associates who interviews approximately 1000 applicants for admission each year. I knew that he was contrasting applicants for admission to curricula in physics and chemistry with applicants for admission in engineering. Finally, I realized that probably he was right. Probably, at the same age level I would have impressed a director of admissions in much the same fashion when I entered college. A very limited amount of reflection will, I think, convince each of you that the young man of eighteen who decides to devote himself to a career of chemistry must of necessity have a somewhat idealistic fixation about the important of pure science in the scheme of the universe. He must come with the belief that "this is to be a true religion." After all, the very young man who was being interviewed could go down to the Brooklyn Navy Yard today and get a job *now* which would pay him a larger salary than he is apt to be offered when he receives the Bachelor's degree in chemistry four years from now. You know the old wisecrack "Does one have to be crazy to be a chemist?" I am sure too you know the answer, "No, but brother it sure helps."

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We must confess that as young men we probably, all of us, lived in an ivory tower. We must confess that the long hours spent in the laboratory at the university level did not leave very much time for the extracurricular proceedings that do succeed, although in a rather wasteful fashion, in developing a knowledge of how to get along with people. It seems to me that the outstanding successes that chemists have had in carrying our science beyond the laboratory, beyond the plant, beyond the industry, have been successes related to their ability to acquire, after they have entered the profession of chemistry, much of the understanding and much of the skill that has been needed.

It is next desirable to inquire why so many chemists with the seeming handicap referred to do achieve outstanding success both within and without their profession in matters having to do with the general understanding of the world and of its

people. Here, I am afraid that my pedagogical background may somewhat bias my evaluations. Nevertheless, I shall bring these comments before you for whatever they may be worth.

First, it seems to me that the arduous training that chemists obtain in observing enables them to make very rapid progress in examining, evaluating and relating any phenomena which present themelves. The habit of keeping a neat and well-organized workbook in the laboratory is one which carries over to other fields. The understanding of what constitutes a competent observer is as valuable in non-quantitative relationships as it is in quantitative relationships. Chemists are, perforce, trained to understand the necessity of establishing the validity of observations. One seldom finds a chemist deciding that the "crowing of the rooster causes the sunrise", despite the well-known fact that roosters always crow before the sun comes up. Chemists are trained to establish careful criteria to be used in evaluations of phenomena. They are trained to look for significant variations. It can be safely assumed that each one of them knows the possibility of "a lucky mistake." Consequently, they know the importance of a recorded observation when the experiment goes wrong. In the non-quantitative fields of human relationships, it is often possible to supplement the "hunch" by the "scientific guess."

In the second place, the organization of the societies active in the field of chemistry is such that young chemists have increasing opportunities to train themselves both in the expression of their ideas and in their relationships with their fellows. The outstanding job that is being done by most of the local sections of the American Chemical Society should be recalled to your minds. Most of the larger sections of the Society are now organized in geographical sub-sections and in subject matter groups. Meetings-in-Miniature flourish in all parts of the United States. No young chemist with ideas can long lack an opportunity to present these ideas before an audience of his peers. The opportunities for chemists to do committee work in connection with the local organizations of the American Chemical Society offer additional opportunities for both self-expression and self-development in non-quantitative fields. In a number of industrial centers, the existence of small but vigorous chapters of THE AMERICAN INSTITUTE OF CHEMISTS offers very favorable opportunities for the development of one's understanding of his fellow chemist. The existence of student societies in most of our colleges and universities is another valuable opportunity for the young chemist who is growing and expanding in his relationships both with science and with scientists.

In the third place, the growing unity of chemists and of chemistry is both an aid and a challenge to the chemist to develop his own understanding of chemistry and his ability to communicate to both his fellow men and the general public. The very fact that the American Chemical Society is a monolithic structure supporting all aspects of chemistry, pure and applied, is a living symbol of the unity of chemistry. I must, of course, immediately switch my metaphors and point out that chemistry pure and applied is supporting the American Chemical Society. The switching of metaphors only emphasizes the fact of unity. Also, I am sure that no one of my listeners doubts but that each member of THE AMERICAN INSTITUTE OF CHEMISTS is also a loyal, devoted, and enthusiastic member of the American Chemical Society.

The way in which modern chemical industry carries ideas from the laboratory, through the development laboratory, the pilot plant, the plant and on to the sales department is a further evidence of the unity of our science. Once one senses this unity he becomes a great spokesman for chemistry in the whole. The young research man "with his head in the clouds" sees that the sales department does have a role in research. The chemically trained salesman understands, from the beginning, that research has a role in sales. Consequently, one gets from the experience of his professional career the impetus toward a growing understanding of chemistry and of its significance in our modern, highly specialized, industrial civilization.

In my boyhood, it was always customary for the minister to end his sermon with an exhortation. The young sinners were always urged not only to repent but also to do better. This is, I believe, still sound psychology; but perhaps, you may ask what can we do better. My answer is, of course, we can always do better. We can do better by following the pattern that we have followed in learning how to do so well what we are now doing. We can understand our science better. We can understaand one another better. We can understand even better the need for improving communications with the general public. This, of course, brings me back to the general topic of our symposium, "The Chemist and Public Relations." Each of us by developing as far as possible his own understanding and abilities can contribute to better relations between chemists and the general public. This will be a great aid in the further development of our professions. It will also be a further step in making chemistry serve humanity.

New Sales Office: Opened in Minneapolis, Minn., by Dow Chemical Company of Midland, Mich.

Travel Grants: The National Science Foundation will receive applications for a limited number of grants to assist in payment of travel expenses to six international scientific meetings:

International Union of Pure and Applied Physics, London, Eng., July 6-10, 1954.

World Power Conference, Rio de Janeiro, Brazil, July 25-Aug. 8, 1954.

International Union of Theoretical and Applied Mechanics, Brussels, Belgium, July 28-Aug. 2, 1954.

International Mathematical Congress and International Mathematical Union, Amsterdam and The Hague, Netherlands, Aug. 30-Sept. 9, 1954.

International Union of Geodesy and Geophysics, Rome, Italy, Sept. 16, 1954.

The International Scientific Radio Union, Amsterdam, Netherlands, Sept. 1954.

Applications for the first three meetings should be received before Dec. 1, 1953, and for the last three meetings, by Jan. 1, 1954. Application forms may be obtained upon request from the National Science Foundation, Washington 25, D.C.

Appointed: To the sales staff of W. C. Hardesty Co., of Canada Ltd., T. A. Luscomb.

To Be Honored

Dr. Hilton Ira Jones, F.A.I.C., managing director of Hizone Research Laboratories, Wilmette, Ill., will receive the Honor Scroll of the Chicago AIC Chapter, at a meeting to be held October 9, 1953, at the Furniture Club of America, Chicago. Speakers include Dr. Roy C. Newton, F.A.I.C., of Swift and Company, and Chester Gould, creator of Dick Tracy.

Dr. Jones is recognized "because of his marked influence upon the profession of chemistry through his activities as a teacher, as a research director, as a noted lecturer, and as an organizer of and hard-working participant in scientific groups." Readers of THE CHEMIST will recall Dr. Jones as a long-time contributor and member of the Advisory Board.

Reservations for the dinner-meeting may be made with Edward Rapkin, Armour Research Laboratories, 1425 West 42nd St., Chicago 9, Illinois.

Announced: By Dr. Louis Koenig, F.A.I.C., associate director of Southwest Research Institute, San Antonio, Texas, the appointment of Dr. James H. Wiegand as assistant chairman of the Institute's Department of Chemistry and Chemical Engineering.

Speakers at Annual Meeting Symposium on "Recent Advances in Industrial Chemistry": Roger Williams, S. F. Radke showing jet engine component containing titanium, R. M. Adams, R. M. Lawrence, C. P. Neidig, and J. T. Coe.

Titanium

S. F. Radtke, F.A.I.C.

Research Supervisor, Pigments Dept., E. I. du Pont de Nemours & Co., Newport, Del.

(Condensation of a paper presented at Concurrent Session D, "Recent Advances in Industrial Chemistry," at the Thirtieth Annual AIC Meeting, Philadelphia, Pa.)

GREAT technological advances, during and since World War II, pointed the need for new and improved materials of construction. Titanium has received wide-spread acclaim as the answer to many of our problems, and an apparent market was created before there was a proven, economical process for producing the metal. The pressure of the international scene upon mobilization for the "cold war," and the application of titanium to military materiel accounted for much of the confusion. Because of this urgency,

> *"We are particularly interested in encouraging the evaluation of titanium in chemical equipment and will be pleased to hear from any organization interested in cooperative testing."*

industry and the government are now attempting to reverse the normal development cycle for a new material. Aluminum became a tonnage industry sixty-five years after the discovery of an economical reduction process; magnesium required thirty-six years to reach its present scale.

In 1789, Gregor discovered a new metal in the sands from Menachan, Cornwall, and suggested the name menachin for it. Later Klaproth rediscovered the element in rutile, naming it "Titanic Earth" or titanium, from the Titans, the giants of Greek mythology. For reasons given later, he should have named it Loreleium after the mythological Rhine maiden, who lured sailors to their destruction on the rocks below the promontory where she stood with her charms and wild songs!

Hunter, in the early 1900's, then VanArkel and deBoer in the 1930's, developed methods for producing the ductile metal. The first involved the sodium reduction of the tetrachloride of titanium; the second, the hot wire decomposition of the iodide producing material of high purity and ductility.

Some fifteen years ago, Dr. Wilhelm Kroll brought to this country from Luxembourg pieces of the ductile titanium metal made by the process that now bears his name. He found virtually no interest in it. The war interrupted this evaluation, and the Bureau of Mines, aided by Dr. Kroll, was instrumental in developing today's interest. Over one-hundred laboratories now are actively evaluating this metal, and annual research expenditures exceed ten-million dollars. Nearly every nation with mature industries is engaged in the development of the field: Australia, Canada, England, Germany, and Japan. Indications are that the Russians may also be in the race.

There are four basic reasons for this astounding development: Titanium is light in weight, high in strength, has good corrosion resistance in many media, and there are significant deposits of its ores. In density, titanium lies between the light structural metals, aluminum and magnesium, and the heavier metals of iron, nickel, and copper. In strength, titanium is also midway between the light and heavy metals, but its strength is considerably greater than aluminum and magnesium alloys, though lower than alloy steel. We are comparing commercially pure titanium with highly developed alloys, yet, though still in the early stage of development, the alloys of titanium approach alloy steel in strength.

The two properties, strength and density, are usually expressed as the strength-weight ratio. This index emphasizes the weight savings made possible with titanium. Generally speaking, it tells what weight of material is required to meet a specific structural strength. With two ma-

terials of equal strength, but one having one-half the density of the other, the lighter would have a strength-weight ratio double that of the heavier material.

The superiority of titanium is even more significant in the temperature range of 400-800°F. Aluminum and magnesium alloys are virtually useless at 600°F while titanium still retains an appreciable fraction of its room temperature properties.

Titanium has good corrosion resistance, but it is far from being resistant to all corrosive media. It is attacked by higher concentrations of sulfuric, hydrochloric, phosphoric and formic acids. Titanium, like stainless steel, is subject to passivation, and in the presence of oxidizing agents, it is frequently possible to tolerate more severe corrosive conditions than in a neutral environment. One application under field test consists of a solution of oxidizing salt in 20 per cent sulfuric acid. In chloride systems, particularly sea water, titanium shows phenomenal resistance, equivalent to that of platinum and Hastelloy C. Samples exposed to virtually all marine conditions for three years have been unaffected. It is unusually good in respect to its endurance limit, corrosion fatigue, crevice corrosion, and cavitation resistance in sea water.

Titanium is the fourth most abundant of the structural metals,

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exceeded only by magnesium, aluminum, and iron. The total amount of it is over four-times as great as the estimated combined available supplies of manganese, chromium, nickel, copper, zinc, lead, mercury, and tin. Its commercially important deposits are world-wide. In the United States, significant sources are in Florida, Virginia, New York, and Wyoming. In Canada a major deposit supplies material to that country and to the United States. The two major ores are ilmenite, a ferrous titanate, and rutile, primarily titanium dioxide.

Industrial and Military Applications

The favorable strength-weight ratio of titanium has lead to wide evaluation in aircraft structures and power plants, which have used over ninety per cent of the metal produced to date. Air frames and jet engines are its most important applications. The first commercial aircraft utilizing it is the new DC-7, built by Douglas, which will have titanium sheet in the skin and firewalls of the engine nacelles, where it will result in a weight savings of about 400-

pounds per plane through the use of 1000-pounds of titanium. It has been in use on military jet aircraft for some time, such as the Boeing B-52 and the jet fighters of Lockheed, North American, and Republic. Generally it is used in the exhaust and after-burner shrouds, and those portions of the skin subject to aerodynamic heating. The supersonic Douglas X-3 has used titanium sheet for that purpose. Titanium is also used in sections of the jet engine where temperature conditions permit, as in the compressor section. Despite its high melting point of 1725°C, its use is limited to temperatures around 800°C.

Titanium's high toughness and low weight suggest ordnance uses. The Ordnance Corps is investigating its use for mobile artillery — gun carriage outriggers, recoilless rifle gun tubes, small arms and their components. Its use in 81 mm. mortar base plate has been announced. This permits the mortar unit to be carried by two instead of three men. Titanium's toughness makes it ideal for armor. Under ballistic assault, titanium plate, 60 per cent as heavy as alloy steel, has equivalent resistance to penetration. It appears that heavy tanks constructed of titanium could be made airborne.

Though outstanding in corrosion resistance to sea water, marine applications have received little attention because of cost considerations. However, critical items such as valves, condensers, and submarine components are under investigation.

In the chemical industry, titanium is important to chemical equipment. Even at its present high price, a survey within the Du Pont Company shows that excessive maintenance justifies its utilization, particularly in chloride media. We found it the only solution in the case of a steam condenser where chloride entrainment was involved.

Potential fields of application in the chemical industry include:

The pulp and paper industry where sulfite pulp gives serious corrosion difficulties, particularly in screening.

Photography where emulsions must be held in corrosion resistant trays.

Textiles where synthetic fibers offer special corrosion problems.

Pharmaceuticals. One large drug firm is employing appreciable quantities of titanium tubing.

Petroleum where salt and sulfur, resulting in the formation of SO_2 and HCl, are especially detrimental.

Organic syntheses where titanium seems to offer considerable promise in highly corrosive organic systems.

Other proposed uses include tanks for ore extraction, filters for highly corrosive media, etc.

We are particularly interested in encouraging the evaluation of titanium in chemical equipment, and will be pleased to hear from any organization interested in cooperative testing.

This field of potential application adds up to a sizeable civilian market, possibly of the order of 100-500,000 annual tons. This can be achieved

only if the price of titanium can be made competitive with stainless steel.

Production

The methods for producing our structural and industrial metals have followed an interesting pattern. Iron and copper are produced by reducing the ore, followed by a "fire purification" of the crude metal to burn and slag off the impurities. The next major development came with aluminum and magnesium. Here the materials which are reduced must first be carefully purified before the reduction to the metal can take place. A new step in process metallurgical philosophy and technology was required for titanium.

In 1939, Du Pont undertook to develop a fully continuous process for the manufacture of titanium dioxide pigment, as an alternate for the sulfate process. Extensive research resulted in a large, fully integrated pigment plant in 1948, now operating at capacity. As the first step in pigment manufacture, we chlorinate the ore obtained from our deposits in Trail Ridge, Fla. The plant produces as an intermediate titanium tetrachloride with an impurity level of a few parts per million.

Dr. Kroll's process is the only proven commercial process for the manufacture of titanium metal. It employs the basic reaction:

$$Mg + TiCl_4 \rightarrow 2\ MgCl_2 + Ti$$

With an excellent source of titanium tetrachloride from our continuous pigment process, it was natural for us to investigate the production of titanium metal. Simple as this reaction appears, the engineering of it has been most arduous. The reaction of magnesium and titanium tetrachloride is rapid and highly exothermic. About 120 kilocalories are released when a gram mole of these materials react. If allowed to react spontaneously, an explosion results. Moreover, we have no materials of construction to hold titanium above 1000°C., since, in this range, it forms a series of low-melting alloys with all commercial metals, or reacts with refractory liners. In addition, the reaction product must be protected from the air since titanium reacts rapidly with O_2 and N_2 at elevated temperatures. So little as 0.01 per cent of these impurities has a pronounced, adverse effect on the properties of the final product.

After completion of the reduction, we must separate the titanium from the unreacted magnesium and the by-product magnesium chloride. The vessel must be maintained at 1000°C

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and a micron level of pressure. Considering the formidable nature of these engineering obstacles, we have made real progress in reaching batch sizes as high as 3000-pounds. The final product removed from the reactor is a gray, porous, sponge-like mass of titanium.

Our initial pilot plant started in July, 1948. The first commercial sale of titanium was made in September, 1948. Design of the first commercial plant began in April, 1950, and in 1951 this unit, at Newport, Del., was placed in operation. It has permitted us to more than double production each year since 1948. At present, two additional commercial plants are under construction at Government request. One, constructed by the Titanium Metals Corp. of America, is starting up at Henderson, Nev. The other is being erected by the Du Pont Company at Newport, Del. Negotiations are under way with other organizations to further increase the annual supply of titanium sponge to a total of 22,000-tons by 1955.

Fabrication

Before the sponge metal can be worked, it must be melted and fabricated. Conventional melting equipment is inadequate for handling titanium since it reacts violently with the gases of the atmosphere and all other gases but argon and helium. There is no known refractory that does not react partially with molten titanium, which at its melting point is virtually the universal solvent. These factors required the design of new furnaces employing an electric arc for heating, and water-cooled copper molds wherein the titanium forms its own refractory as it is melted under an inert atmosphere of argon or helium.

Once the metal is consolidated into an ingot, it can then be fabricated on conventional steel mill equipment. The following companies are the primary producers of titanium mill products:

Rem-Cru Titanium, Inc. (Jointly owned by Remington Arms and Crucible Steel)
Republic Steel Corporation
Mallory-Sharon Titanium Corporation (A joint effort of P. R. Mallory and Sharon Steel)
Titanium Metals Corporation of America (A cooperative venture of National Lead and Allegheny Ludlum)

Ingots as large as two tons are now being cast. Since in volume this is equivalent to about 4-tons of steel, the fabrication of titanium on large continuous strip and sheet mills can be accomplished. It can be deep drawn, made into tubing, spot welded, stretch formed, cold formed, press formed, machined, ground, sawed, brazed, forged, and the pure metal welded by inert gas arc welding techniques. Precision castings have been made on a small scale. However, the working of the metal is more difficult than that required for the common metals and falls into a category resembling that of the high

alloy stainless steel.

The Future of Titanium

The major problem facing the industry is the production of cheap sponge, which sells now for $5.00 per pound while fabricated forms go as high as $20.00 per pound. Large sums are being spent by the industry and Government in quest of THE process. We ourselves are spending a million annually on research. Who can say what the method will be — a version of the Kroll process, an electrolytic process or an electrowinning process. It is not overly optimistic to predict that new processes will be developed in the near future for the manufacture of titanium metal.

The fabricators have serious problems in producing new and better alloys with improved machinability, improved weldability and formability; melting techniques to provide purer and more homogeneous alloys, to permit the casting of shapes, to permit the full utilization of scrap.

Much remains to be done in the development of precipitation hardenable alloys, improved heat treatability, and to determine the full effect of impurities such as carbon, hydrogen, oxygen, and nitrogen.

In summary:

(1) The production of metal is rapidly expanding, with a goal of 22,000 annual tons forecast by 1955.

(2) Titanium has great potential value as a structural material where weight, strength, and corrosion resistance are important, particularly at intermediate temperatures.

(3) It is of great strategic importance because of its availability on the North American continent.

Now you can see why titanium should have been named Loreleium. Its charms may lure the unwary to disaster, but the goal is there for those who survive the ordeals enroute!

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Formed: The Atomic Industrial Forum, Inc., 29 West 39th St., New York, N. Y., an organization of businessmen, engineers, scientists, and educators, interested in the industrial development and application of atomic energy for peaceful uses. Dr. T. Keith Glennan, president, Case Institute of Technology, Cleveland, Ohio, former member of the Atomic Energy Commission, proposed the organization.

Never-ending quest

THE men in our laboratories recognize no time clocks nor set working hours. Forever they are seeking—as a prospector might for a tell-tale grain of gold that leads to fortune.

They are looking for better ways to make the chemicals we produce—for new combinations that would serve good purposes—for different uses in which our kind of chemicals could be employed.

Our organization welcomes inquiries pertaining to our chemicals. All correspondence is strictly confidential.

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Home from Indonesia: Frank E. Firth, F.A.I.C., of Milton, Mass., who has spent the past two years in the U. S. Foreign Service as Fisheries Officer (Attache) assigned to the Mutual Security Agency and Technical Cooperation Administration technical missions, in Indonesia, with headquarters at Djakarta (formerly Batavia) in Java. He trained 1480 Indonesians, captains and master fishermen, in marine diesel engine operation and maintenance, to operate the 178 diesel engine craft supplied by the U.S.A. In eight months of actual commercial operations, these craft produced approximately 1-million 800-thousand kilograms of fresh fish, with a value of 3,800,000 Rupiahs. Ice making plants, deep-freeze (quick freeze) plants, and refrigerated carrier boats, for transporting the frozen fish to areas lacking in protein food supplies, are now being installed under Mr. Firth's direction. A completely equipped diesel-engine and boat maintenance station will be furnished to service the equipment supplied by the U.S. In his Washington report, Mr. Firth gave a complete accounting for all supplies furnished to Indonesia for their fisheries development, which showed the tremendous economic and technical results achieved in two years at an expenditure of less than three-million U.S. dollars. Mr. Firth expects to return to M.S.A. T.C.A. foreign activities this fall.

Communications

Suggestions Urgently Requested

To the Secretary:

Your knowledge may mean a new life for a worthwhile man. Where can a bright chemist, now invalided, use his talents?

My friend is single, a native American, forty years old. He was graduated, 1934, by Grinnell College, Iowa, with a major in chemistry and minors in mathematics, physics, German and education. He reads and writes French perfectly. He made Phi Beta Kappa. Vermont University gave him the Master's Degree in 1937; major in organic chemistry and minor in physiological chemistry. He stayed on at Vermont doing laboratory supervision in inorganic chemistry, substitute teaching and tutoring. Subsequently he taught, briefly, physics and algebra in a high school. He took further post graduate work but this was stopped when he found he had *Fredrika Ataxia*, an incurable, inherited, nervous disorder. That discovery so depressed him he has withdrawn from active life on the assumption that he couldn't be of value to chemistry from a wheel chair. (That's why I've butted in; he can't bring himself to approach men in your position.)

He's no freak. He earns a living through bookkeeping and tax work for himself and very old mother in Red Oak, Iowa. But he needs work. In chemistry. Somehow, can't the profession use him? Is there any sort of related work which he could do at long distance? I cannot adequately express the devoted care and intelligent handling of work which I feel someone could get from this man. Please pass me any suggestions you have.

—(Names will be given on request)

Editor's Note: Your suggestions can be a definite professional contribution. Not only will they enable the profession to utilize this chemist, but also other incapacitated chemists, whose mental abilities are especially valuable at this time when technically trained minds are in short supply. Please send your suggestions to THE CHEMIST, and they will be sent to the author of the above letter. A summary of the replies will be published later, with or without the names of the contributors, as they may request.

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Starting Salaries: For June engineering graduates of Illinois Institute of Technology reached an all-time high average of $362 a month, according to Earl C. Kubicek, placement director. A year ago the figure was $335. Five years ago, $265; ten years ago, $169; and fifteeen years ago, $100.

"Every June graduate . . . already has a job," Mr. Kubicek stated. "Even those facing military service were snapped up by industry. Most companies were willing to hire service-eligible engineers in the hope that, even if they were called up after a few months, the experience they gained with the firm and the seniority they accrued while in service would induce them to return to their former employer."

A breakdown of the salaries received by the graduates showed that the architects averaged $399 a month; mechanical engineers, $377; electrical engineers, $371; industrial engineers, $370; mathematics majors, $368; civil engineers, $367; physics majors, $360; chemistry majors, $356; chemical engineers, $352; fire protection and safety engineers, $342; business and economics majors, $327; and metallurgical engineers, $317.

Appointed: DeWitt O. Myatt as manager of development of Atlantic Research Corp., Alexandria, Va. He has been managing editor of *Industrial and Engineering Chemistry* for the past seven years.

To Ohio: James W. Perry, F.A.I.C., Madeline Berry, M.A.I.C., and Allen Kent, F.A.I.C., specialists in the development of information systems, who have joined the staff of Battelle Memorial Institute, Columbus 1, Ohio. They formerly worked as a team at Massachusetts Institute of Technology where they pioneered in the development of more efficient methods for storing and sorting technical information. They are co-authors of a forthcoming book, "Systematized Terminology for Machine Indexing." Battelle's technological information service aims at "assisting science and industry in streamlining the costly and burdensome job of tapping existing published knowledge."

Chemical Inspires Music: Ortho nitro biphenyl, "ONB", is saluted in a samba, distributed by Monsanto Chemical Company, on a 10-inch, 78 rpm record, to customers. On the reverse side is the Monsanto March. Both were composed by Russ David. Information on ONB, which is used, among other things, as a flow aid in the manufacture of unbreakable plastic phonograph records, is served up on the record jacket.

Address Changed: By Werner Jacobson, M.A.I.C., translator and chemist, from 2800 W. Harrison St., Chicago, to 2732 W. Lexington St., Chicago 12, Ill.

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Raymond S. Stevens, F.A.I.C.

Vice President, Arthur D. Little, Inc., 30 Memorial Drive, Cambridge, Mass.

IN SCIENCE we need ideas — creative ideas. Within our lifetime, research has become complex, highly organized, and schematized. In the past decade alone, industrial research has become big business, and the acceptance of industrial research as an honored and well-paid profession has sent more and more young men flocking to the laboratories.

In industrial research, these creative ideas are a must, and they are related to age; they come, according to research data, mainly from relatively young men. We must do more to encourage creative thinking, even if it means paying young scientists for their years of top creativity, much as a ballplayer is paid most during his years of greatest usefulness. Adequate retirement income is perhaps the most difficult personal problem for the professional man to overcome today. Indeed, for the majority it is impossible to create a substantial estate for retirement.

To "guarantee" complete security for retirement is not a satisfactory solution to the dilemma, for this may dull the keen edge of the creative mind. On the other hand, the majority of the pension plans currently in vogue today seldom result in anything approaching adequate retirement income. The management of Arthur D. Little, Inc., believes that the individual should be assisted in amassing enough capital in his early, productive years to allow for a comfortable retirement in the later, less productive ones. This philosophy does not mean that the professional man should be handed "security" on a silver platter.

In an effort to at least partially solve this growing problem, Arthur D. Little, Inc., several years ago established an employee retirement trust, known as the Memorial Drive Trust, for the benefit of those employees making a career of the company. Named as trustees are: Marshall B. Dalton, president, Boston Manufacturers Mutual Fire Insurance Company; Horace S. Ford, treasurer emeritus, Massachusetts Institute of Technology; Royal Little, chairman, Textron, Inc.; and Earl P. Stevenson, F.A.I.C., president Arthur D. Little, Inc.

Although majority control of a company by its employee-retirement trust was an almost unique form of ownership, it was felt to be parti-

cularly appropriate to our situation. Arthur D. Little, Inc., is a personal service organization, and since our success depends in part upon the creativity of our staff, it is fitting that the staff should have a stake in the company's corporate success.

In early July the Trust offered to purchase any outstanding shares of ADL common stock. The largest single block of stock had been held in trust for the Massachusetts Institute of Technology according to the will of the late Dr. Arthur Dehon Little, founder of the company. The proceeds of the stock, now valued at $1,300,000, had been used for educational purposes at the Institute. Other shares of common stock were purchased at the same time by the Trust.

By choosing to invest their funds in Arthur D. Little, Inc., itself, the trustees of the Memorial Drive Trust are creating an even closer bond between the staff and the company. Even more important, it means that the professional man may, by his own efforts in his chosen field, contribute substantially to his personal retirement program.

Briefly, the Trust operates in this fashion. The company contributes to the Trust each year half of its profit, in accordance with a formula set up in the Trust Agreement. The total contribution is limited by regulations of the Bureau of Internal Revenue to fifteen per cent of the total compensation paid to all permanent, full-time employees during the year. Each member has an account in the Trust. At the end of each year (including the year in which a new member is employed), the Trust credits to each member's account his share of the year's contribution. Each member's credit is in proportion to his compensation (excluding any bonus but including overtime) during the year.

The Trustees are empowered to lend money to members at four per cent interest for the education of the member's children beyond secondary school. This is the sole purpose for which the Trust is permitted to make loans to members.

The Memorial Drive Trust supplements the Company's Pension Plan but differs from it in several ways. As mentioned above, all permanent, full-time employees become members of the Memorial Drive Trust at the end of the calendar year during which they are hired, while five years of service are required for membership in the Pension Plan. Contributions to the Memorial Drive Trust are contingent on Company profits, while payments into the Pension Plan are usually not; and the rights of the employee who leaves ADL are different.

This new ownership marks a milestone in the career of our company whose history in many ways parallels that of industrial research. We have

grown in size from a corporation employing about eighty people in the late 1930's to one employing over seven-hundred people today. Over sixty per cent of this number are members of the technical staff. Augmenting this staff we have continually retained many scientists from leading educational institutions on a consulting basis.

At the time of the stock purchase, Dr. James R. Killian, Jr., president of the Massachusetts Institute of Technology, stated, "The fact that we are no longer owners of Little's common stock will not in any way affect the fine relationship M.I.T. has long had with the company. We look forward to many years of close association with our neighbor and we shall always be grateful to Dr. Arthur D. Little for his generous help to M.I.T."

Dr. Little's original laboratory, established in 1886 as one of the earliest industrial research laboratories, was devoted principally to chemical research. Today the organization conducts consulting research, engineering, and related activities in virtually all fields of applied science. We are confident that our unique form of ownership and its retirement benefits to the professional man will be of help in the stimulation of creative ideas in these varied fields of applied science.

Emphasis: On the chemical field will be given by the Middle Eastern District Meeting of the American Institute of Electrical Engineers, to be held in the Daniel Boone Hotel, Charleston, West Va., Sept. 29-Oct. 1, 1953.

Retired: Frederick R. Haigh, F.A.I.C., recently in charge of chemical development for Botany Mills, Inc., Passaic, N. J. Before joining Botany in 1943, he was chief of the of the Chemical Division, OPA, Region 2.

New Terminal: Opened at Industry, Pa., by Shell Chemical Corp., to serve the Pittsburgh area.

Elected: Dr. Roger W. Truesdail, F.A.I.C., of Truesdail Laboratories, Inc., 4101 N. Figueroa St., Los Angeles 55, Calif., as president of the Association of Official Racing Chemists. He has been the official chemist for the State of California for fourteen years and serves in a similar capacity for the Hipodromo de Tijuana, Mexico.

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Something New

"Optical and Electronic Building Blocks." Bulletin 103. Perkin-Elmer Corp., Norwalk, Conn.

"Emery Plasticizer booklet." Emery Industries, Inc., Dept. 5, Carew Tower, Cincinnati 2, Ohio.

"VK-7 Electric Box Furnace." Information. Coolet Electric Manufacturing Corp., 905 Daly St., Indianapolis, Ind.

"Styrene Modified Alkyd Resins." Technical Data Report. Monsanto Chemical Co., Texas City, Texas.

"Precision — A Measure of Progress." Booklet. General Motors Corp., Broadway at 57th St., New York 19, N. Y.

"General catalog." Jasonols Chemical Corp., 1085 Myrtle Ave., Brooklyn 6, N. Y.

"Witco Stabilizer No. 80." Technical Service Report. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y.

"High Temperature Lubrication." Bulletin. Acheson Colloids Co., Port Huron, Mich.

"Model 112-S Infrared Spectrometer." Bulletin A-1. Perkin-Elmer Corp., Norwalk, Conn.

"Laboratory Planning Kit." Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

"Chloroacetaldehyde." Booklet. Dow Chemical Co., Midland, Mich.

"Glyceryl Monostearate NF." Glyco Products Co., Inc., 26 Court St., Brooklyn 1, N. Y.

"Transmission-Type Interference Filters." Brochure. Bausch and Lomb Optical Co., Rochester 2, N. Y.

"Physical Properties of Synthetic Organic Chemicals." Booklet. Carbide and Carbon Chemicals Co., 30 East 42nd St., New York 17, N. Y.

"Shaler Generator-Motor Cleaner." Information. The Shaler Co., Waupun, Wisconsin.

"Model B-30-D Condensifilter." Information. Hankinson Corp., 142 Biltmore Bldg., 951 Banksville Rd., Pittsburgh 16, Pa.

"New Constant Temperature Humidity Cabinet." Information. Blue M Electric Co., 306 West 69th St., Chicago 21, Ill.

"Properties and Essential Information For Safe Handling and Use of Cresol". Safety Data Sheet SD-48. $0.25. Manufacturing Chemists' Association, Inc., 5413 Empire State Bldg., New York 1, N. Y.

"Scotchcast, Casting Resins." Booklet. Minnesota Mining and Manufacturing Co., 900 Fauquier St., St. Paul 6, Minn.

"Hydrocap", a new type storage battery cap. Information. Industrial Research Inc. 4016 N.W. 29th St., Miami 42, Fla.

"Ktrol, New Electronic Level Control." Information. Greylor Co., 605 W. Washington Blvd., Chicago 6, Ill.

"Warning Labels", a guide for the preparation of warning labels for hazardous chemicals. Manual L-1. $1.00. Manufacturing Chemists' Association, Inc., 246 Woodward Building, Washington 5, D.C.

Keeping Abreast with Scientific Advances in Cosmetic Chemistry

J. R. Martin

Director, Cosmetic Research Laboratories, Coty, Inc.
730 Fifth Ave., New York, N. Y.

ONE of the problems that confront the director of a research laboratory is the scanning and rapid evaluation of the literature published on technical subjects. This has to be done in a systematic way, and as thoroughly as possible, as an integrated part of a research program, if one is to get from it all possible information of value.

The amount of scientific literature published is so staggering that it is impossible for one person to cover all of it; even if it were possible, it would be a useless duplication of effort. Besides, it is evident that the interest aroused by a given article and its proper understanding, depend on one's training and specialty. We therefore sought to resolve our problem by distributing all reading matter to the personnel, according to their respective interests and fields of activity. This system reduces to a strict minimum the time spent on reading by each member of the staff, and brings results with a good measure of efficiency.

There is a minimum of specific literature available on cosmetics. The information we find necessary for our work lies in many and greatly varied fields: Dermatology, physiology, biology, pharmaceuticals, organic synthesis, analysis — organic and inorganic, fats and oils, antioxidants, preservative detergents, plastics, metals, glass, adhesive equipment, etc. Though it may seem that some of these are "borderline" subjects, they are intimately related to our industry.

At the start of this program, a meeting of the research staff was held to determine which periodicals were essential to us for the widest range of information covered, and which should be subscribed to. Each member of the staff gave his views, and a list was established accordingly. The dividing of the reading matter among them was also determined. For instance, all medical literature was given to those trained in that field, all literature on analysis to the analyst, all items pertaining to purely organic chemistry (excluding pharmaceuticals) to the organic chemist; as an example, the perusing of "Chemical Abstracts", of the American Chemical Society, was thus divided among the research chemists,

according to each one's specialty. Our reading matter also includes European literature, as well as domestic and foreign patents.

Another important part of the program is the classifying of information obtained through catalogs and pamphlets from various manufacturers, i.e., systematic classification of detergents, antioxidants, antiseptics, etc., not only according to the data given, but also according to our own experience with these materials in the course of our research work.

Every two weeks a seminar is held, during which each member gives an account of his reading. A general discussion takes place, and an evaluation is made of the worth of the information supplied. This information is classified into three sections:

(a) Information of immediate interest

(b) Information useful for long range research programs in the process of development

(c) Information to be held available for possible future reference if and when the need arises.

A secretary is present, and takes the minutes of the discussion, which are typed, a copy being supplied to each member of the staff. The information thus collected is then given to the librarian, whose job it is to record for easy and prompt reference all subjects of interest, so they may be traced readily whenever necessary, through a card catalog index system.

If, through discussion during the course of the meeting, it is deemed necessary to procure samples of new materials, pamphlets, books, etc., these are secured by members of the staff, selected according to their particular fields, and the matter is followed up at the next meeting, with a view to its integration into the research program.

This system of literature scanning has been extended on a reciprocal basis to the international members of our organization who supply us, in turn, with the information they gather at their end.

Now that this system has become an integral part of the research organization, all the members seem to find it quite stimulating inasmuch as each one benefits by the general discussion, information and ideas brought in by the others, through their reading and study. They realize that they are supplied with valuable information which they could not have had otherwise, and profit thereby in their own field of research.

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National Council Meetings

Meetings of the AIC National Council are scheduled to be held at The Chemists' Club, 52 East 41st St., New York, N. Y., at 6:00 p.m., on the following dates:

Sept. 16, 1953
Nov. 11, 1953
Jan. 13, 1954
Mar. 10, 1954
Apr. 14, 1954

Addresses Wanted

If you know the present address of any of the following AIC members, please send it to the Secretary of the American Institute of Chemists, 60 East 42nd Street, New York 17, N. Y. The last address from which mail has been returned is shown for each member.

Charlotte Jane Backer
635 *West Warren Avenue, Apt.* 11
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Rowena G. Hodge
University of Redlands
Redland, California

Elsa Orent Keiles
8333 *Grubb Road*
Silver Spring, Maryland

Andrej Macek
2552 *Universiy Place*
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Richard Miller
70 *Chester Circle, Raritan Gardens*
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715 *East Boulevard*
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Karl Vorres
Biochemistry Department, University of Southern California, Los Angeles 7, *California*

AIC Activities

C. P. Neidig, F.A.I.C.

Chicago Chapter

Chairman, Herbert F. Schwarz
Chairman-elect, Dr. Lloyd A. Hall
Vice Chairman, Clifford A. Hampel
Secretary, John Krc, Jr., Armour Research Foundation, Technology Center, Chicago 16, Illinois.
Treasurer, Albert S. Henick
Representative to National Council, Dr. Gustav Egloff

Chemists Are Human

The Chicago Chapter met May 8th at the Engineers Club. Richard Maguire announced that Dr. Hilton Ira Jones, F.A.I.C., would receive the next Honor Scroll Award of the Chapter. Retiring chairman Dr. B. S. Friedman then introduced Dr. William I. Harber, discussion leader, who in turn introduced Russell Babcock, chairman of the Illinois State Commission on Human Relations.

Mr. Babcock stated that his Commission must report at the opening session of the Illinois State Legislature and also to the Governor. Last year the Commission sampled Chicago and eighteen communities with a large Negro population, contacted two-thousand businessmen, and, after two follow-ups, fifty-four percent of their questionnaires were returned.

It was found that in Illinois one out of three employers does not hire a Negro. If we look at the chances for a Negro, compared to a white man, to get a management job, we find that his chances are ten per cent as good; to get a clerical job, twenty-five per cent as good, and to get a skilled job, fifty per cent as good; whereas to get an unskilled job, his chances are three-hundred per cent better.

If we look at the same figures for the chemical industry, eighteen firms of fifty to five-hundred employees each answered as follows: (They had 8500 employees, only 3.4% Negroes, while the population has 12 to 14 per cent of Negroes.)

Position Held	*White*	*Negro*
Manager	10.2%	4.0%
Clerical & Sales	6.2%	0.4%
Skilled	13.4%	7.0%
Unskilled	12.4%	50.0%

What causes this?

The employers create the problem occasionally because of personal prejudice, but mostly by accepting the patterns of the community. The feeling is: I hire a Negro, I lose my white help. But when this is actually tried out, it does not happen!

The attitude of the Negro, too, has something to do with the problem; he often does not have the good job he deserves because

(a) he has no relatives or friends in the field to encourage him, and

(b) he very often encounters discouragement from his immediate family, from other adults and from teachers who emphasize the discrimination he will encounter.

By watching the situation, we see that some individuals break through, but it is a slow process. Roughly one-eighth of the people is affected by this prejudice. Betterment can be brought about by several approaches. Here is one of them: Our children learn more by percept than by precept. Negroes who join the Big Leagues, go to Harvard, have increased by leaps and bounds; one broke the ice, the others now see the example (the percept). He can do it, so I can do it too, as contrasted to the concept, This is nothing for Negroes.

Dr. Leo K. Bishop, vice president and regional director of the National Conference for Christians and Jews, then spoke, dealing not only with discrimination against Negroes, but also against Jews, Catholics, etc. He cited an example of companies where there is a Protestant and a Catholic president. The companies' affairs do not go well, because these two people fight all the time because of their different religions. This sounds funny, but unfortunately such doings cost annually twenty-eight billion dollars to the U. S. economy. Four-fifths of the population holds some kind of prejudice, and this curtails production. Accidents are more frequent in plants with prejudice; teamwork is destroyed; absenteeism increases.

The victims of prejudice have nothing to do with the attitude, because (1) An insecure person tends to show prejudice — the reason for the insecurity is unimportant. It is always safe to be hostile to a minority group. (2) We accept our environment without questioning; thus if there is prejudice in the environment, we pick it up. (3) Family disorganization is a source of intolerance. (4) The white adult male with an unhappy childhood is inclined to be hostile to a minority. In other terms, children of a low income group hate the group which competes with them for the paper route, the playground, the father's job, the apartment they want, etc. They create a vocabulary of dirty names. Now if they are removed from this level and brought into a better one, they simply change their object and subjects of hate to those who compete with them at the new level. (5) There is a greater tendency toward negative feeling, where one parent is foreign-born. Our attitudes are determined by experiences of our own, by security or insecurity of our own. Human relations mean how people get along with each other if their cultural backgrounds are different.

The National Conference of Christians and Jews developed for this purpose a series of ten one-hour seminars for Industrial Education. The following results were noted: (1) It is difficult to work on an individual, one must work on a group. Bring people together, make them work together, and the hostility breaks down. (2) Do not interfere when people wish to get acquainted with each other. (3) If you want to know people, work with them. (4) Prejudice can sometimes be changed by legislation, especially if children grow up without seeing legally sanctioned cases of prejudice. (5) Anything which promotes better communication among and between groups, promotes understanding and abates prejudice.

There may be those who think that one really should not worry about these things. They are the people who think they are not affected by all this. Strangely enough they are affected. For example:

(1) We are suffering in great parts of

the United States from a housing shortage. There are 110,000 construction workers in the U. S. at this moment unemployed or making their living in another way, because their skin has the wrong color, their religion is not considered A-1, or similar reasons. Some of these were for five years carpenters for the Seabees!

(2) A truckdriver shortage in 1946 was, among other things, due to the fact that 5,000 truckdrivers, who drove for the Army along the Burma road, could not find this employment inside the U. S. after their discharge, for the same reasons. (3) Democracy is on trial for the next twenty-five years. Two economic systems at this very moment are trying to get a big share of the earth; the system of free enterprise and the system of controlled economy. We hope our way of living will be the winner. We must keep in mind that the bulk of the population of the earth is non-Christian and non-White, and that they are shocked when they read in their newspapers stories like the Cicero riot, the Peoria Street incident, and others. Thus prejudice affects everybody, even if the person apparently is a member of a majority.

—WERNER JACOBSON, M.A.I.C.

Opportunities

Doris Eager, M.A.I.C.

Positions Available

Textile Technician: Female, college graduate, B.S. in chemistry, physics, or Home Economics-Textiles. Some experience in textile laboratory preferred, but will consider recent college graduate who has thorough knowledge of physical testing methods, breaking strength, color fastness evaluation, etc. Location New York. Box 81, THE CHEMIST.

Plating Foreman: Nickel-chrome cycle anodizing, supervisory position, not over 45 years of age. Salary $6,500. Location Metropolitan New York. Box 83, THE CHEMIST.

Assistant Product Sales Manager: Organic Chemicals. Chemical or chemical engineering degree. Experience in selling and sales management with basic organic chemicals. Capable of addressing meetings; collecting, interpreting and distributing information on production performance, product availability, competitive activities. Age 35-45. Salary up to $15,000 plus usual benefits and incentive plan paying up to 30% of salary. Location midwest. Box 85, THE CHEMIST.

General Manager: Successful general management experience in production, sales and profit goals. Production and administrative experience in chemical process manufacturing industry. Knowledge of marketing and promotion methods. Capable of coordinating sales and production. Ability to plan and carry through programs. Salary $25,000 or better dependent upon capabilities. Box 87, THE CHEMIST.

Senior Chemist: Staff Assistant to Director of Development, between 30-35 years of age; Ph.D. or equivalent in physical or organic chemistry. Original thinker with initiative to establish and carry through own programs with minimum supervision. Approximately 5 years experience in chemical research and development with industrial organization. Location midwest. Box 89, THE CHEMIST.

Chemists Available

Biochemist: F.A.I.C., Ph.D. with basic engineering courses. Main experience food and pharmaceuticals; research and development, control, technical service and writing; some production; some teaching. Mature, healthy and energetic, four dependents. Desires responsible research or supervisory position. Will relocate. Box 62, THE CHEMIST.

Organic Chemist: Ph.D., F.A.I.C. Diversified experience, including supervisory, in the synthesis and development of pharmaceuticals from laboratory through full scale production, including formulation work. Publications. Age 33, family. Desires challenging opportunity with good growth potential. Box 84, THE CHEMIST.

Organic Chemist: Ph.D., 1951, extensive background in organic synthesis and development of analytical methods. Seeks position as project leader. Prefers location in New York area. Box 86, THE CHEMIST.

Emulsions: 26 years' experience in research, development, supervision of production and management in the emulsion field including Latex Paint, Adhesives, Waxes, Resins, Shoe Finishes, Leather Finishes and Specialty Items. Presently engaged in Consulting Service. Seeks responsible position with progressive company. Midwest preferred. Box 88, THE CHEMIST.

For Your Library

Detergents

What They Are and What They Do. By Donald Price, Ph.D., F.A.I.C. 1953. *Chemical Publishing Co.* 8¾" x 5¾", 159 *pp.* $4.00.

Daily, the public is subjected to advertisements for soap, synthetic detergents, household cleaners, written by those whose ignorance of the subject is as profound as that of most of their audience. The confusion is then used for more scientifically ludicrous statements. The public should welcome this book. It tells, among other things, how to select a cleansing agent. Advertising copywriters should also read this book. It may inspire bright, new ideas for valid copy!

There is a real need for the type of book that explains the scientific background and facts about commonly used but little understood materials. Dr. Price has carefully explained in non-technical language the chemical behavior of detergents, their types, functions, methods of testing, the whole leavened with some delightful bits of the history of cleanliness. The chapters are headed. "What Detergents Are," "How the Synthetic Detergents Were Developed," "What Detergents Do," "Household Detergents," "Testing and Choosing Detergents," "Where Do Detergents Go from Here?" References are added.

Anyone who needs a survey and some technical knowledge will be enlightened with the information in "Detergents." Adult education classes could profitably make this book one of their texts, and school libraries should surely place it on the reference shelf.

—V.F.K.

Chemical Books Abroad

RUDOLPH SEIDEN, F.A.I.C.

Carl Hanser Verlag, Munich 27: *Chemische Technologie, Vol V; Metallurgie; Allgemeines,* by K. Winnacker and E. Weingaertner; 1953, 846 pp. (311 ill., 117 tables); DM 74.50.—Volumes I-III of this most complete work on chemical technology were reviewed in THE CHEMIST in 1951 and 1952. If there were an Oscar available for outstanding scientific-technical books, my vote would go to the editors and publishers of this magnificent publication. The latest volume contains the metallurgy, from ore dressing to the production of the various metals and their alloys, their properties, uses, economical importance, etc. Methods for the protection of metal surfaces are discussed in a special chapter. The last 212 pages are dedicated to topics of general interest to chemical technologists: industrial instruments and equipment; energy sources and their uses; factory planning and layouts; legal considerations; safety measures, etc.

Collection Arman Colin, Paris Ve: *Petroles naturel et artificiels,* by J.-J. Chartrou; 3rd ed., 224 pp. (17 ill.); paper covers, Fr. 260.—A brief survey of crude oil and its many derivatives, their production, properties, analysis, uses, synthetic substitutes, etc.

The Northern Publishing Co., Liverpool: *Tablet Making,* by A. Little and K. A. Mitchell; 1951, 121 pp. (47 ill.); 15 s.—This is a reprint of the book reviewed in THE CHEMIST: April, 1950, issue. It's probably still the best publication available on the manufacture of tablets.

Karl F. Haugh Verlag, Saulgau-Wuertt.: *Taschenbuch der pflanzlichen Therapie,* by Ernst Meyer; 2nd ed., 469 pp.; DM 16.80.—The first part reviews the herbs used medicinally (217 pp.), the second is a compilation of hundreds of formulas including those of proprietary preparations. This book does not seem to fit into our era of advanced chemotherapy.

Condensates

Ed. F. Degering, F.A.I.C.

Lest we forget:

"It is a gloomy moment in history. Not for many years — not in the life time of most men who read this has there been so much grave and deep apprehension; never has the future seemed so incalculable as at this time. In our own country there is universal unrest and millions of our fellow citizens are fearful of the future.

"In Europe and Asia the political caldron seethes and bubbles with uncertainty. Russia hangs, as usual, like a cloud dark and silent upon the horizon of Europe; while all the energies, resources and influence of the British Empire are sorely tried, and are yet to be tried more sorely, in coping with the vast and deadly disturbed relations in China and India.

"It is a solemn moment and no man can feel an indifference which, happily, no man pretends to feel in the issue of events.

"Of our own troubles (in the U. S. A.) no man can see the end. They are, fortunately, as yet mainly political and commercial; and if we are only to be taught wisdom — the wisdom of honor, of faith, of sympathy and of clarity — no man need seriously to despair.. We are to resist and subdue the forces which are the occasion of this widespread evil and harmful distress.

"The sunshine comes and goes, the clouds lower and pass. The road has its peaks and sloughs. But with feet firmly planted on God's good earth, with a heart full of courage and love, we can join the work of creation by making out of the world what God intended." — *Harper's Weekly, Oct.* 10, 1857.

The new manzate fungicide, produced from natural gas, protects both the fruit and foliage of the tomato plant, whereas formerly two fungicidal chemicals were required.

Water cools itself with a C-R Chill-Vactor

A Chill-Vactor is a three-stage steam-jet vacuum unit which serves to flash-cool water and certain other liquids through temperatures down to 32°F. No chemical refrigerant is used. There are no moving parts. Water literally "cools itself" by partial evaporation at high vacuum. Vacuum refrigeration is usually less expensive than mechanical refrigeration in first cost as well as operating cost.

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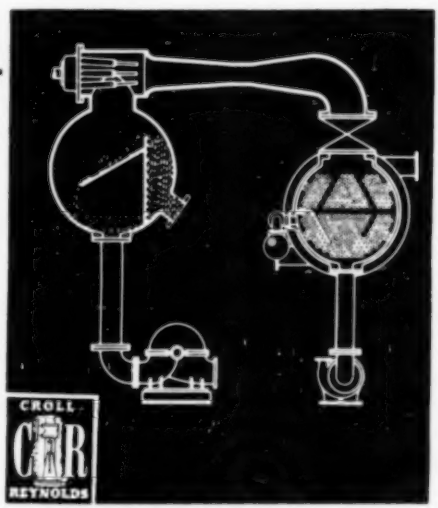
The Chill-Vactor is only one type of steam-jet evactor manufactured by Croll-Reynolds. Let our technical staff help you with any or all of your vacuum problems.



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You may find Celite the "extra something" needed to lift your product above competition. Why not discuss its application to your problem with a Celite engineer? Or write for further information and samples to Johns-Manville, Box 60, New York 16, N. Y. In Canada: 199 Bay St., Toronto, Ont.

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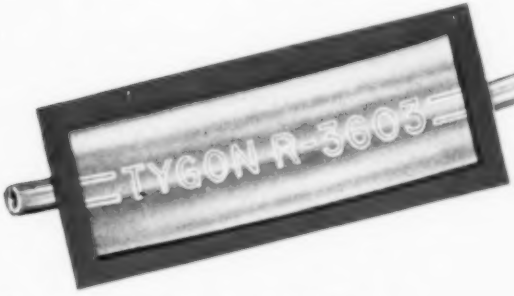

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